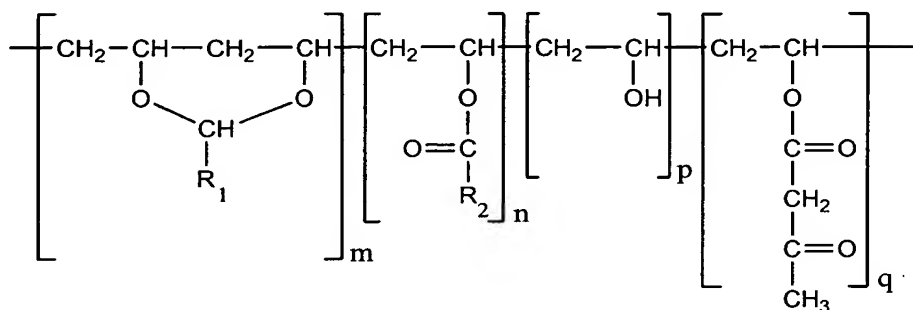


CLAIMS

What is claimed is:

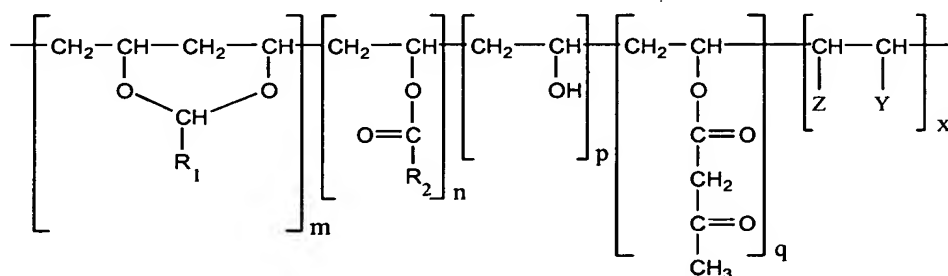
1. A curable composition comprising crosslinkable and crosslinking components wherein said crosslinkable component comprises:

(a) an acetoacetylated polyvinyl polymer having the formula:



- wherein (m) ranges from about 1.5 mole percent to about 85 mole percent, (n) ranges from about 0 mole percent to about 20.5 mole percent, (p) ranges from about 12 mole percent to about 87 mole percent and (q) ranges from about 1 mole percent to about 88 mole percent, sum of (m), (n), (p) and (q) being 100 and wherein R₁ and R₂ are independently H, substituted or unsubstituted C₁ to C₁₂ alkyl, substituted or unsubstituted C₆ to C₁₄ aryl, substituted or unsubstituted C₇ to C₂₂ aralkyl, substituted or unsubstituted C₆ to C₁₄ alkaryl, substituted, unsubstituted C₄ to C₁₄ carbocyclyl or a combination thereof, said substituents being independently selected from the group consisting of C₁ to C₁₂ alkoxy, acyl, carboxyl, derivative of carboxyl, sulfonyl, derivative of sulfonyl, cyano, and halo;

- (b) an acetoacetylated polyvinyl polymer having the formula:



wherein (m) ranges from about 1.5 mole percent to about 85 mole percent, (n) ranges from about 0 mole percent to about 20.5 mole percent, (p) ranges from about 12 mole percent to about 87 mole percent, (q) ranges from about 1 mole percent to about 88 mole percent and (x) ranges from about 0.5 to about 6 mole percent, sum of (m), (n), (p), (q) and (x) being 100 and wherein R₁ and R₂ are independently H, substituted or unsubstituted C₁ to C₁₂ alkyl, substituted or unsubstituted C₆ to C₁₄ aryl, substituted or unsubstituted C₇ to C₂₂ aralkyl, substituted or unsubstituted C₆ to C₁₄ alkaryl, substituted, unsubstituted C₄ to C₁₄ carbocyclyl or a combination thereof, and wherein Z is H, or -COOH and Y is -COOH, halo, unsubstituted phenyl or a combination thereof; said substituents being independently selected from the group consisting of C₁ to C₁₂ alkoxy, acyl, carboxyl, derivative of carboxyl, sulfonyl, derivative of sulfonyl, cyano, and halo;

(c) a combination thereof; and

wherein said crosslinking component comprises a polyamine, a polyketimine, polyepoxide, polyisocyanate, melamine, C₁ to C₁₂ alkyl dialdehyde, C₁ to C₁₂ alkyl poly(meth)acrylate, or a combination thereof.

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2. The coating composition of claim 1 wherein in said acetoacetylated polyvinyl polymer R₁ is propyl and R₂ is methyl.

3. The coating composition of claim 1 wherein GPC weight average molecular weight of said acetoacetylated polyvinyl polymer ranges from about 20,000 to about 300,000.

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4. The coating composition of claim 1 wherein Tg of the acetoacetylated polyvinyl polymer ranges from about 40°C to about 60°C.

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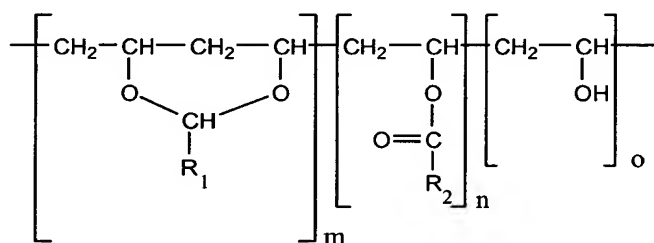
5. The coating composition of claim 1 wherein said acetoacetylated polyvinyl polymer is solubilized in one or more solvents.

6. The coating composition of claim 1 wherein said crosslinking component comprises a polyamine, a polyketimine, or a combination thereof.

7. The coating composition of claim 1 wherein VOC of said composition ranges from 0.1 to 0.72 kilograms per liter of said composition.

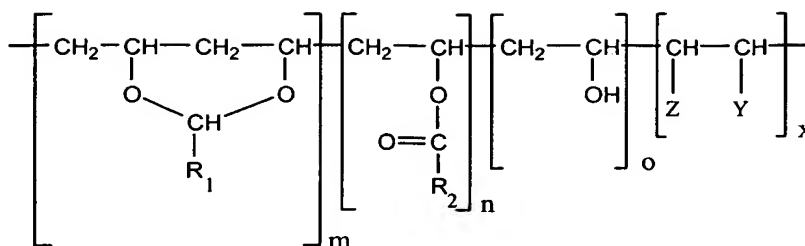
8. The curable coating composition of claim 1 wherein said acetoacetylated polyvinyl polymer is produced by the steps comprising:

- (i) dissolving in one or more solvents:
 (a) a polyvinyl polymer having the formula:



wherein (m) ranges from about 1.5 mole percent to about 85 mole percent, (n) ranges from about 0 mole percent to about 20.5 mole percent and (o) ranges from about 13 mole percent to about 98.5 mole percent, sum of (m), (n) and (o) being 100 and wherein R₁ and R₂ are independently H, substituted or unsubstituted C₁ to C₁₂ alkyl, substituted or unsubstituted C₆ to C₁₄ aryl, substituted or unsubstituted C₇ to C₂₂ aralkyl, substituted or unsubstituted C₆ to C₁₄ alkaryl, substituted, unsubstituted C₄ to C₁₄ carbocyclyl or a combination thereof, said substituents being independently selected from the group consisting of C₁ to C₁₂ alkoxy, acyl, carboxyl, derivative of carboxyl, sulfonyl, derivative of sulfonyl, cyano, and halo;

- (b) a polyvinyl polymer having the formula:



- wherein (m) ranges from about 1.5 mole percent to about 85 mole percent, (n) ranges from about 0 mole percent to about 20.5 mole percent and (o) ranges from about 13 mole percent to about 98.5 mole percent and (x) ranges from about 0.5 to about 6 mole percent, sum of (m), (n), (o) and (x) being 100 and wherein R₁ and R₂ are independently H, substituted or unsubstituted C₁ to C₁₂ alkyl, substituted or unsubstituted C₆ to C₁₄ aryl, substituted or unsubstituted C₇ to C₂₂ aralkyl, substituted or unsubstituted C₆ to C₁₄ alkaryl, substituted, unsubstituted C₄ to C₁₄ carbocyclyl or a combination thereof, and wherein Z is H, or -COOH and Y is -COOH, halo, unsubstituted phenyl or a combination thereof; said substituents being independently selected from the group consisting of C₁ to C₁₂ alkoxy, acyl, carboxyl, derivative of carboxyl, sulfonyl, derivative of sulfonyl, cyano, and halo; or
- 15 (c) a combination of thereof to form a solution;
 - (ii) contacting said solution with C₁ to C₁₂ alkyl acetoacetate to produce said acetoacetylated polyvinyl polymer.

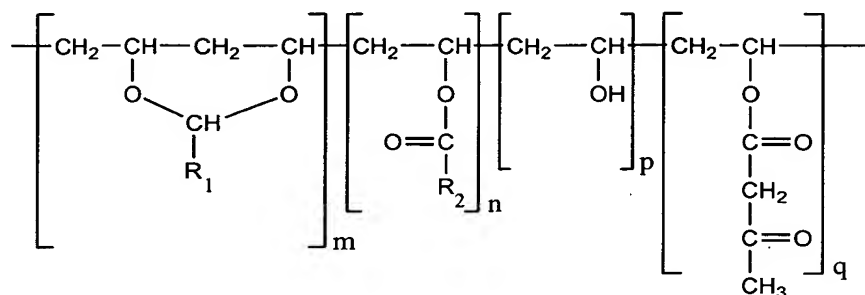
9. The composition of claim 8 wherein said R₁ is propyl and
20 said R₂ is methyl.

10. The coating composition of claim 1 formulated as automotive
refinish or OEM wash primer composition.

25 11. A method of producing a coating on a substrate comprising:

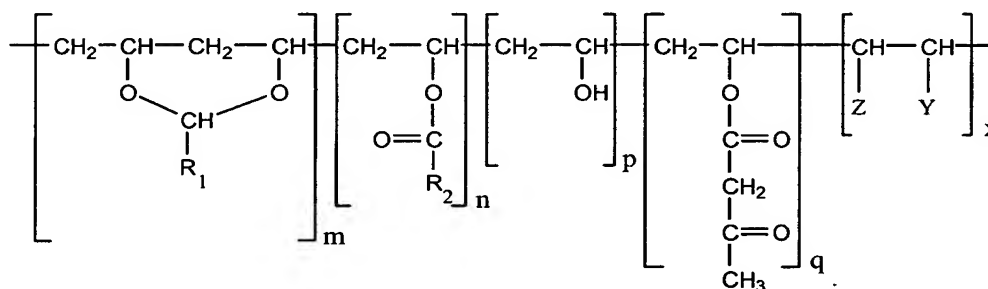
- (i) mixing a crosslinkable component with a crosslinking component of a curable coating composition to form a pot mix, wherein said crosslinkable component comprises:

(a) an acetoacetylated polyvinyl polymer having the formula:



- wherein (m) ranges from about 1.5 mole percent to about 85 mole percent, (n) ranges from about 0 mole percent to about 20.5 mole percent, (p) ranges from about 12 mole percent to about 87 mole percent and (q) ranges from about 1 mole percent to about 88 mole percent, sum of (m), (n), (p) and (q) being 100 and wherein R₁ and R₂ are independently H, substituted or unsubstituted C₁ to C₁₂ alkyl, substituted or unsubstituted C₆ to C₁₄ aryl, substituted or unsubstituted C₇ to C₂₂ aralkyl, substituted or unsubstituted C₆ to C₁₄ alkaryl, substituted, unsubstituted C₄ to C₁₄ carbocyclyl or a combination thereof, said substituents being independently selected from the group consisting of C₁ to C₁₂ alkoxy, acyl, carboxyl, derivative of carboxyl, sulfonyl, derivative of sulfonyl, cyano, and halo;

(b) an acetoacetylated polyvinyl polymer having the formula:



- wherein (m) ranges from about 1.5 mole percent to about 85 mole percent, (n) ranges from about 0 mole percent to about 20.5 mole percent, (p) ranges from about 12 mole percent to about 87 mole percent, (q) ranges from about 1 mole percent to about 88 mole percent and (x)

ranges from about 0.5 to about 6 mole percent, sum of (m), (n), (p), (q) and (x) being 100 and wherein R₁ and R₂ are independently H, substituted or unsubstituted C₁ to C₁₂ alkyl, substituted or unsubstituted C₆ to C₁₄ aryl, substituted or unsubstituted C₇ to C₂₂ aralkyl, substituted or unsubstituted C₆ to C₁₄ alkaryl, substituted, unsubstituted C₄ to C₁₄ carbocyclyl or a combination thereof, and wherein Z is H, or –COOH and Y is –COOH, halo, unsubstituted phenyl or a combination thereof; said substituents being independently selected from the group consisting of C₁ to C₁₂ alkoxy, acyl, carboxyl, derivative of carboxyl, sulfonyl, derivative of sulfonyl, cyano, and halo;

(c) a combination thereof; and

wherein said crosslinking component comprises a polyamine, a polyketimine, polyepoxide, polyisocyanate, melamine, C₁ to C₁₂ alkyl dialdehyde, C₁ to C₁₂ alkyl poly(meth)acrylate, or a combination thereof;

(ii) applying a pot mix layer over said substrate; and

(iii) curing said pot mix layer under ambient conditions or at elevated cure temperatures to form said coating on said substrate.

12. The method of claim 11 wherein said R₁ is propyl and said R₂ is methyl.

13. The method of claim 11 or 12 further comprising applying a layer of base coating composition on said pot mix layer before said curing step.

14. The method of claim 13 further comprising applying a layer of clear coating composition on said layer of base coating composition before said curing step.

15. The method of claim 14 further comprising drying said pot mix layer before said curing step.

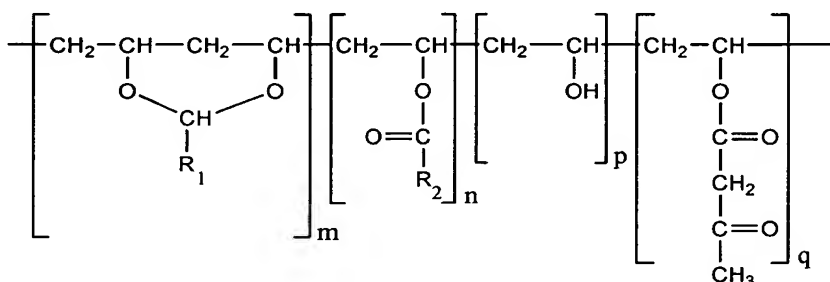
16. The method of claim 15 wherein said coating composition is a wash primer composition.

17. The method of claim 11 wherein said substrate is an automotive body.

18. A method of producing a multi-coat system on a substrate comprising:

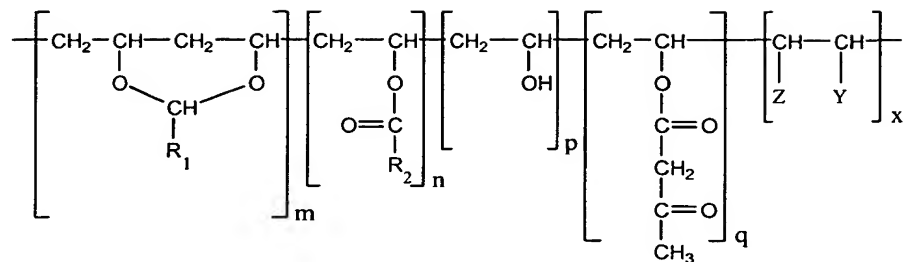
(i) mixing a crosslinkable component with a crosslinking component of a curable coating composition to form a pot mix, wherein said crosslinkable component comprises:

(a) an acetoacetylated polyvinyl polymer having the formula:



wherein (m) ranges from about 1.5 mole percent to about 85 mole percent, (n) ranges from about 0 mole percent to about 20.5 mole percent, (p) ranges from about 12 mole percent to about 87 mole percent and (q) ranges from about 1 mole percent to about 88 mole percent, sum of (m), (n), (p) and (q) being 100 and wherein R₁ and R₂ are independently H, substituted or unsubstituted C₁ to C₁₂ alkyl, substituted or unsubstituted C₆ to C₁₄ aryl, substituted or unsubstituted C₇ to C₂₂ aralkyl, substituted or unsubstituted C₆ to C₁₄ alkaryl, substituted, unsubstituted C₄ to C₁₄ carbocyclyl or a combination thereof, said substituents being independently selected from the group consisting of C₁ to C₁₂ alkoxy, acyl, carboxyl, derivative of carboxyl, sulfonyl, derivative of sulfonyl, cyano, and halo;

(b) an acetoacetylated polyvinyl polymer having the formula:



- wherein (m) ranges from about 1.5 mole percent to about 85 mole percent, (n) ranges from about 0 mole percent to about 20.5 mole percent, (p) ranges from about 12 mole percent to about 87 mole percent, (q) ranges from about 1 mole percent to about 88 mole percent and (x) ranges from about 0.5 to about 6 mole percent, sum of (m), (n), (p), (q) and (x) being 100 and wherein R₁ and R₂ are independently H, substituted or unsubstituted C₁ to C₁₂ alkyl, substituted or unsubstituted C₆ to C₁₄ aryl, substituted or unsubstituted C₇ to C₂₂ aralkyl, substituted or unsubstituted C₆ to C₁₄ alkaryl, substituted, unsubstituted C₄ to C₁₄ carbocyclyl or a combination thereof, and wherein Z is H, or -COOH and Y is -COOH, halo, unsubstituted phenyl or a combination thereof; said substituents being independently selected from the group consisting of C₁ to C₁₂ alkoxy, acyl, carboxyl, derivative of carboxyl, sulfonyl, derivative of sulfonyl, cyano, and halo;

(c) a combination thereof; and

- wherein said crosslinking component comprises a polyamine, a polyketimine, polyepoxide, polyisocyanate, melamine, C₁ to C₁₂ alkyl dialdehyde, C₁ to C₁₂ alkyl poly(meth)acrylate, or a combination thereof;

- (ii) applying a pot mix layer over said substrate;
- (iii) applying a layer of base coating composition on said pot mix layer;
- (iv) applying a layer of clear coating composition on said layer of base coating composition to form a multi-layer system on said substrate; and

(v) curing said multi-layer system under ambient conditions or at elevated cure temperatures to form said multi-coat system on said substrate.

19. The method of claim 18 wherein said coating composition is formulated as a primer composition.

20. The method of claim 18 further comprising applying a layer of a primer over said pot mix layer before said step of applying said layer of said base coating composition.

21. The method of claim 20 wherein said coating composition is formulated as a wash primer composition.

22. The method of claim 18,19 or 20 wherein said substrate is an automotive body.